ANNUAL REPORT

OF

THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

TO THE

PRESIDENT OF HARVARD COLLEGE

FOR

1934-1935

CAMBRIDGE, U. S. A.
PRINTED FOR THE MUSEUM
1935

PUBLICATIONS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

There have been published of the BULLETIN, Vols. I to LXV, LXVI No. 1 & 2, LXVII–LXXVIII No. 3, LXXIX No. 1 & 2, of the Memoirs Vols. I to LII, LIV No. 1 & 2.

The BULLETIN and MEMOIRS are devoted to the publication of original work by the Officers of the Museum, of investigations carried on by students and others in the different Laboratories of Natural History, and of work by specialists based upon the Museum Collections and Exploration.

These publications are issued in numbers at irregular intervals. Each number of the Bulletin and of the Memoirs is sold separately. A price list of the publications of the Museum will be sent on application to the Director of the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

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LIBRARY
MUS. COMP. ZOÖLOGY
CAMBRIDGE, MASS.

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TABLE OF CONTENTS

PAGE

Report of the Director . . . . . . Thomas Barbour 7

Report on Marine Invertebrates . Hubert Lyman Clark 11

Report on Oceanography . . Henry Bryant Bigelow 13

Report on Entomology . . . . Nathan Banks 15

Report on Mammals . . . . Glover Morrill Allen 20

Report on Birds . . . . James Lee Peters 24

Report on Mollusks . . . . . William James Clench 27

Report of the Research Curator of Zoölogy
Ludlow Griscom 29

Report on Reptiles and Amphibians . Arthur Loveridge 31

Report on Invertebrate Palaeontology
Percy Edward Raymond 33

Report on Vertebrate Palaeontology
Alfred Sherwood Romer 37

Report on Helminths . . . Jack Henry Sandground 41

Report on Fishes . . Nicholas Andreevich Borodin 43

Report on Fossil Echinoderms . Robert Tracy Jackson 45

Report on the Coelenterates . . Elisabeth Deichmann 47

Report on the Crustacea . . Fenner Albert Chace, Jr. 50

Report on the Library . . . . Eleanor Sweet Peters 51

Publications 53

Invested Funds of the Museum 65

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HENRY BRYANT BIGELOW
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REPORT OF THE DIRECTOR

1934–1935

To the President of Harvard College:
Sir:—

During the past year I have been absent from the Museum for a considerable period of time. I was at the Atkins Institution at Soledad, Cuba, preparing the new leases and concluding a resurvey and mapping of the entire property, including large additions of new fields and woodlands for which complete plans were prepared for their planting. A great deal of time and thought was given to the elimination of duplicates, and the Garden was left more beautiful and far more useful, potentially, than it had ever been before. Doctor E. D. Merrill made his first visit to the Garden as my guest, as did also Colonel and Mrs. Robert H. Montgomery who flew over from their Palmetum in South Florida. To Colonel Montgomery's generosity we owe a large number of our most recent accessions. Several students studied at the Cuban Laboratory this summer and Dr. Kevorkian of the Botanical Department is working there as I write these lines. The devastating hurricane of September 28 and 29 passed directly over Soledad, and we have learned to our grief that the destruction was tremendous.

I made another journey to South Africa visiting a number of museums and other educational institutions, and secured some valuable collections by purchase and arranged for many important exchanges. I also visited a number of wild life reserves and national parks in the interests of the International Wild Life Protection Committee, and have prepared a series of recommendations in the form of a report concerning the future of these reserves and their management which is shortly to be forwarded to the National Parks Board of the Union of South Africa for their consideration.

I completed during the year the second annotated checklist of the reptiles and amphibians of the West Indian Island area with special reference to the forms which have become extinct and the reasons for their extirpation. I also prepared, during the year, the MS. of a guide book to the Exhibition Collections and an Historical Account of the Research Collections with an appraisal of the relative importance of those in the care of each department of the Museum. I had cordial assistance from the several Curators and for this I express my thanks.

I wrote also an Historical Account of the Teaching of the several branches of Natural History from the beginning of such activities to the present time.

Through the kind generosity of Mr. George R. Agassiz who has helped us so often in the past, it has been possible to replace the old glass in the exhibition hall of reptiles and amphibians with new plate glass. Under Mr. Loveridge's supervision the exhibits have all been reinstalled and the room is now one of the best exhibits of its kind in the world.

Thanks to another friend of the Museum new cases have been built in the exhibition rooms devoted to fossil vertebrates the better to display Mr. Nelson's superb mounts of our fossil horses and camels, so that they may play their due part in connection with the new courses in palaeontology to be given for the first time this year by Doctor Romer. It is impossible to express adequately our appreciation for the artistry and skill which Mr. Nelson has developed in connection with mounting these fossil mammals. Many palaeontologists have come to see them and frankly admit that they are uniquely excellent. However it is difficult for one man to keep up with our preparation needs.

Field work was carried out this year by Messers. White and Price in Texas and New Mexico and while some excellent material was obtained from the Permian and Triassic, their work was seriously curtailed owing to the heavy unseasonable rains.

Mr. Clench, accompanied by Mr. John H. Huntington and Mr. Henry Russell, visited Cat Island in the Bahamas, an island concerning which very little was known, and secured a very complete representation of its vertebrate and invertebrate fauna. The journey was made under conditions involving a great deal of hardship, inasmuch as these gentlemen's appreciation of our *restricted* finances inclined them to attempt this most successful journey with very limited funds in hand.

Mr. Henry Seton went to the Bad Lands accompanied by Mr.

Charles P. Lyman, and at the time of writing they are still in the field.

As for years past I can only repeat how fortunate the Museum is in its generous friends, and its self-sacrificing staff.

The list of publications show but in part the productivity of the Staff inasmuch as many contributions have to be published in other than Museum journals.

The exchanges completed during the year are extremely satisfactory and the gifts in the form of material as abundant as they have been during the last few years. For all these we are deeply grateful. The reports of the several curators will substantiate adequately these remarks which at first sight may seem a bit fulsome.

Just before returning to Cambridge opportunity presented to visit the zoölogical laboratory at Cambridge, England, in company with Professor William M. Wheeler. This visit will ever remain a delightful memory, overwhelmed as we were with kindly hospitality from many colleagues there. We visited the museums in and about London and, quite by chance, in reading the new General Guide to the British Museum (Natural History) I chanced upon three short paragraphs which I think will go far to rest the mind of anyone who may occasionally ask himself, "Is it really worth while for the University to keep on with that old Museum?"

"A large part of the business of the Museum consists in acquiring complete series of objects, in accurately naming them, in arranging them according to a natural system, and in having them available for study. The existence of such great collections makes possible the correct naming of objects, and the correct name of an animal, a plant, or mineral is the key to all that is known about it. To these collections zoölogists and botanists turn when they want to name the animals and plants collected in remote and little-known lands, and draw on them for help in solving endless scientific problems. With their aid the racial characteristics and relationships of plants and animals are studied, their growth, their geological history, and their geographical distribution. The Reserve Collections constitute from the scientific point of view the most important part of the Museum, for the new knowledge derived from their study is given to the world by means of books and memoirs, and in scientific circles the reputation of a museum largely depends on the number and quality of its publications. It would clearly be impracticable to show in the public galleries the millions of specimens required by investigators for the advancement of knowledge. It would first be necessary to build galleries miles in length, and the specimens would be rendered inaccessible to the detailed examination of the specialists and students for whose use they are intended."

"A Natural History Museum is, then, a collection of objects, both animate and inanimate, found in a state of nature. The laws and processes with which physics, chemistry, and physiology are chiefly concerned do not lend themselves to being easily or satisfactorily demonstrated by a museum exhibit. It is only the products of these laws and processes, the results of the changes in the raw material of the universe brought about by their working, that are capable of being exhibited in a museum. As the study of such products is one of the means of arriving at an understanding of the laws which led to their formation, it is plainly desirable that an illustrative series of them should be made as complete as possible, for the furtherance of the knowledge which the Museum is designed to promote."

"Natural history is distinct from human history, but the distinction is far from absolute, for the investigation of the effects of domestication on plants and animals, which might legitimately be regarded as a branch of human history, forms a part of natural history; and there are other areas where the two studies overlap. Bacon has defined its place in the hierarchy of human knowledge in these words: 'Physic (taking it according to the derivation, and not according to our idiom for medicine) is situate in a middle term or distance between natural history and metaphysic. For natural history describeth the variety of things; physic the causes, but variable or respective causes; and metaphysic the fixed and constant causes.' "

REPORT ON MARINE INVERTEBRATES

By Hubert Lyman Clark

Most of the time during the year has been devoted to the large collections of Australian echinoderms, accumulated during the years 1929–1934. The study of the crinoids, echini and holothurians has been completed and the manuscript covering those groups is ready for the final report. With the capable assistance of Mrs. Karl M. Pattee, the crinoids and holothurians have been incorporated in the study collections and series have been selected for the different Australian museums which have so generously coöperated in the work. Dr. Deichmann has given much aid in connection with the holothurians, sacrificing no little time in making preparations and sketches. Of crinoids, 760 specimens were added to the collection, including 4 genera and 13 species new to us. Of holothurians, 1321 specimens were added, including 44 species and 10 genera new to us. The total catalogued accessions for the year were 2324 specimens, with 59 species and 14 genera new to the Museum.

In April and May, a visit was paid to the Charleston Museum and several days of interesting dredging were made possible by the cordial generosity and coöperation of the Director, Mr. E. M. Burton, and one of the curators, Mr. G. Robert Lunz, Jr. The echinoderms taken were of more than usual interest, including species first collected before the Civil War by Louis Agassiz and Dr. William Stimpson, at least one of which had not been secured since.

An unusual amount of time has been given to the identification of echinoderms for other institutions and individuals and to the resulting correspondence. This is, of course, work amply justified in itself but it usually results also in valuable material being presented to us. Our thanks are due for accessions to the following persons: Messrs. F. N. Balch, E. P. Chase, W. F. Clapp, R.

Foster, P. de Mesa, Melbourne Ward and D. J. Zinn; to Drs. R. T. Jackson and Jay Pearson; and to the Charleston Museum, the University of Southern California and the Woods Hole Oceanographical Institution. An exchange with the Goteborg Zoölogical Museum was also carried out.

REPORT ON OCEANOGRAPHY

BY HENRY B. BIGELOW

The chief item of oceanographic coöperation during the past year, between the Museum and the Woods Hole Oceanographic Institution has been an investigation, by Mr. Stetson, of the bedrock underlying the Continental Shelf.

In August, 1934, on "Atlantis," he dredged fossiliferous rock-fragments from the walls of three of the steep submarine cañons on the seaward slope of Georges Bank. Examination of the fossil molluscs and echinoderms by Dr. L. W. Stephenson, of the U. S. Geological Survey, and of the fossil Foraminifera by Dr. J. A. Cushman has identified the formations as Upper Cretaceous and Late Tertiary. A joint report is now ready for publication.

Field work was continued in July-August, 1935, with dredging along the lower slopes of the submarine valley of the Hudson, and of three of the gorges off the Delaware-Maryland coast.

The chief significance of this work lies in the fact that these steepsided gorges offer an opportunity to sample the older material of which the continental shelf is composed, and thus to establish at least the outside time-limits for major Tectonic movements in which this coast has been involved.

On last summer's cruise, a new type of coring instrument was tried out, by Dr. C. S. Piggot of the Carnegie Institution, and cores of 8–9 feet were obtained; being the longest yet obtained in deep water. Cores were also taken in January, 1935, from "Atlantis" in deep water near Bermuda, for a study of the fine sediment which mantles the cone. A report by Mr. Stetson is in preparation.

Bottom samples, from Ross Sea, for study, have been donated by Mr. Edward Roos, of the second Byrd-Antarctic Expedition. Field work on the problem of the origin of the shoals of Vineyard and Nantucket sounds has been completed.

Mr. Iselin continues to supervise the operations of "Atlantis." All computations, charts and diagrams for his report on the general hydrology of the Western North Atlantic have been completed, and the text is nearly ready for printing. During the winter he delivered a course of lectures on Physical Oceanography at the Massachusetts Institute of Technology.

Quantitative study of vertical distribution of Plankton, in deep water, was continued, by Mr. Benjamin B. Leavitt, on two "Atlantis" cruises, in July and August, when closing-net hauls were made at 200-meter intervals, on the continental slope off Woods Hole, and outside the Gulf Stream.

Mr. W. C. Schroeder, in his studies of the cod, has analyzed the rate of growth of scales of fish from different grounds, with special reference to possible racial differences, and migratory movements by different stocks of fish. He also started an experiment (still in progress) at Woods Hole on rate of growth of scales in relation to body-length, of cod kept in different temperatures, and began work on a synoptic account of Canadian-Atlantic bony fishes, for publication by the Biological Board of Canada.

Lieutenant G. van A. Graves, Ice Observation Officer on the International Ice Patrol Service, worked in the Museum during the autumn and winter. The 1935 Patrol was begun on March 9th, and from that date until September 2, he was continually at sea, first off Newfoundland, and later in the Labrador basin.

The sorting of the siphonophores of the last "Dana" expedition, mentioned in last year's report, was continued at the Marinbiologisk Laboratorium in Copenhagen, under a grant from the Milton fund. Two shipments have reached the Museum.

With the assistance of Dr. Mary Sears, work was continued on the "Thor" collection of Siphonophores. Our report on the salinity of the waters on the Continental Shelf, Cape Cod to Chesapeake Bay, was completed and published. And Dr. Sears has finished the identification of the Plankton collections made by the U. S. Bureau of Fisheries in that same region. By a recent arrangement, the Directorship of the Woods Hole Oceanographic Institution has been made a half-time position, allowing me more opportunity for work in the Museum.

REPORT ON ENTOMOLOGY

By Nathan Banks

The principal additions to the collections are from Central America and the West Indies. Mr. Darlington spent about four months in Cuba, Jamaica, and Hayti and obtained about 18,000 specimens of all orders, although more than half are Coleoptera. Particularly valuable species were secured by him on his ascent of Mt. La Hotte, hitherto unknown entomologically. Descriptions are already written of new Myriopods, Arachnids, Neuroptera, and Coleoptera. Mr. Darlington has presented various other Coleoptera.

Mr. Bates spent a year collecting in Hayti, Panama, Honduras, and Guatemala. He obtained about 5000 specimens in Hayti, and in over four months on Barro Colorado Island pinned over 16,000 moths taken at light. Many thousand more were in papers besides several thousand other insects. Instructed by Mr. Bates, the caretaker at the Island collected and sent several thousand more moths after Mr. Bates left the Island.

In Honduras Mr. Bates also collected quantities of moths at light, and also visited the Bay Islands, off the Honduranian coast. Altogether his trip has added 40,000 specimens to the collections, of which 30,000 are Lepidoptera, representing over 3,500 species.

Central America is also represented in the gift of Mr. E. W. Thompson of 2,800 Mexican beetles, an especially fine lot. Dr. Wheeler collected fully 1000 insects in Guatemala and Panama. Mr. Nevermann sent Carabidae from Costa Rica for study, and Mexican Coleoptera were obtained in exchange from Mr. H. E. Hinton.

Other material from the West Indies includes 2000 small flies from the Boston Society of Natural History, several hundred miscellaneous insects from Cuba and Jamaica from Professor Brues, and numerous beetles from A. Audant, C. G. Aguayo, and E. M. Ducasse.

Mr. Loveridge brought back about 4000 insects (including

Hemimerus) from East Africa, nearly half from Mt. Elgon. Dr. Barbour obtained several hundred from St. Helena and Madagascar, while Dr. Bequaert got some on his Congo trip. Prof. Brues gave over 1000 mostly small Hymenoptera collected at Foochow, China, by Mr. F. Kellogg, and we purchased from Mr. J. L. Gressitt over 2500 Neuroptera, Diptera, and Arachnids collected on Formosa. About 200 butterflies from Corea were purchased from Mr. L. H. Snyder, and several collections of Indian Carabidae from Mr. P. S. Nathan.

A friend of the Department purchased over 4000 mixed insects collected in Eastern Brazil by Jose Bleaser. Mr. N. A. Weber has spent nearly a year in Trinidad, largely devoting his attention to ants, but has sent about a thousand other insects from there and from Venezuela. He has obtained from one ant-colony many thousand specimens showing mosaic gynandromorphism. These formed the basis of Prof. Wheeler's recent address by invitation of the British Association for the Advancement of Science. Some Paraguayan Carabidae were purchased from A. Schultze.

Mr. F. M. Carpenter on his western trip obtained about 2000 recent insects besides the numerous fossils. Mr. J. A. Griswold gathered several hundred in Arizona. To Dr. J. Bequaert we are indebted, as usual, for hundreds of species of Diptera and Hymenoptera. To A. S. Nocolay for a fine selected set of about 1000 Carabidae. Mr. Bates presented various insects from Florida, and Mr. A. G. B. Fairchild from Florida, Wyoming and Nova Scotia. Miss Bryant collected several hundred in Vermont, and the Curator about a thousand local specimens. For the gift of smaller series we have to thank Dr. S. Graenicher (Florida Hymenoptera), Mr. F. Hill (Australian termites), Mr. E. M. Davis (Florida insects), Mr. W. T. Davis (Cicadas), C. H. Paige (insects and spiders), Dr. Barbour (a pair of an extinct Phasmid, *Karabidion australe*), W. J. Clench (various insects), F. M. Hull (wasps), estate of R. Thaxter (flies and beetles), P. de Mesa (Philippine insects), Dr. C. Philip (Boreus) and to F. E. Baisdell, C. L. Cartwright, H. M. Hatch, R. Hopping, Miss E. M. Mank, C. T. Parsons, F. K. Smith and F. de Zayas for various Coleoptera, Mr. A. L. Stillman (a very interesting collection of butterflies from the Dominican Republic); Brother Roberto, of the Colegio de la Salle, and Mr. S. C. Bruner (several rare and little known Cuban butterflies); Mr. Frank Young (rare Florida Lepidoptera); Mr. R. A. Leussler (a collection of Costa Rican butterflies: the remnant of the material collected by Cary and Carricker at the beginning of the century); Prof. W. T. M. Forbes (several species of Lepidoptera new to our collection). Many duplicate spiders were retained from those sent by Miss Sarah Jones of Dallas, Texas, and fully 25 species obtained in exchange from Mr. Gertsch.

By purchase we acquired material from W. Heron (Australia), Diploptera from Cyprus from G. A. Maursmoustakis, 200 Diptera, Neuroptera and cicadas from K. Duncan.

By exchange we obtained 55 species of Colorado Homoptera from the Colorado State College, Termites from Prof. A. Emerson, Asilidae and Odonata from Mr. A. E. Pritchard, Tabanidae from Dr. C. Philip., Cicindelidae from W. Horn, and Carabidae from M. Banninger. C. H. Lindroth, and J. M. Valentine; Dryopidae from P. N. Musgrave and Stratiomyidae from M. James.

Duplicates, and sometimes uniques, were retained from collections studied.

Since the return from his West Indian trip the Assistant Curator, Mr. Darlington, spent much time mounting his material and arranging the entire West Indian beetle collection. He has studied several groups and prepared papers on them; he has also revised a genus of nearctic Carabidae and attended to routine identifications and correspondence.

Miss Bryant has studied the Cuban spiders collected by Mr. Darlington, published two papers on New Zealand spiders, identified large collections of spiders from Texas and Florida, and attended to the care of the collection.

Mr. Bates, who has been back but three months, has worked over part of his Haitian butterflies, and began assortment and spreading of the Barro Colorado moths.

Mr. Carpenter has published several articles on fossil insects, and nearly finished a revision of the Nearctic Raphidiidae, and described various new Panorpidae. A graduate student, L. J. Milne has worked over our native Trichoptera and prepared a large paper upon them, describing numerous new species.

Three students have worked part time: one of them spreading and labeling butterflies; one has done much labeling of beetles, and the third has helped on various projects.

The Curator has incorporated the Johnson collection of Diptera with the general collection of that order; the Johnson boxes being utilized for the Bowditch Cryptocephalinae. Several parts of the Neuroptera collection were rearranged, to include new material, identified and described the Neuropteroids from Formosa, also most of those collected on Mt. Apo, Phillipines, and parts of the Neuroptera from Australia and the West Indies, describing about one hundred species. He has mounted, labeled, and assorted over 11,000 specimens, fumigated part of the collection, marked and catalogued about three thousand types. He has determined Formosan Psocidae for R. Takahashi, Neuroptera for the Arizona Experiment Station, Ohio State University, Carnegie Museum, Deutsches Entomologisches Institut, and certain families of Hymenoptera for the Colorado State College. Several thousand species labels have been written and placed on specimens.

Nearly all of the short term loans and four of the collections that have been loaned for several years have been returned, thus considerably reducing the amount of material on loan. Of one of these, the Panama Fulgoridae, Prof. L. P. Metcalf has prepared a synoptic paper describing over twenty new species from our collections, and given many excellent illustrations. Mr. H. F. Loomis has also prepared a manuscript on our West Indian Diplopods.

Besides various local visitors, we have had Mrs. D. Blake (Chrysomelidae); Prof. A. M. Chickering for two months (Panama spiders); Prof. C. R. Crosby and Prof. S. C. Bishop (spiders); Mr. C. J. Curran (Diptera); Mr. T. H. Frison (Perlidae); Dr. C. B. Philip (Tabanidae); C. W. Sabrosky (Chloropidae); and J. M. Valentine (Carabidae).

THE W. M. WHEELER COLLECTION OF FORMICIDAE

Last year I recorded the gift of this great collection of ants and estimated the amount in the arranged part as fully thirty thousand specimens. This main collection is now transferred to our standard boxes, occupying 259 of them. The specimens have now been counted, 110,766 in all. Deducting thirty thousand for those we already had (in forty boxes) leaves over 80,000 (instead of 30,000) added last year by Dr. Wheeler.

The collection is arranged according to the Genera Insectorum, and represents 4,900 named forms (species, subspecies, races) and includes cotypes of over 2000 forms. Besides these Dr. Wheeler is temporarily retaining in the collection several hundred cotypes (most Forel) which eventually will be sent to New York; these have all been marked by a plain square of blue paper.

Besides this arranged collection Dr. Wheeler's ant material includes 40 Smitt boxes of Philippine ants, 22 Smitt boxes of Bornean ants, and over 400 boxes of ants from all parts of the world, about one fourth of these being material sent for study by other Institutions. Part of this material has been identified.

Besides this there are over 3000 vials containing from one to several hundred specimens; some of these are named. This material outside of the arranged collection would count fully 100,000 specimens. Dr. Wheeler has given us the greatest collection of ants that has ever been gathered together by one person, and with what we had this forms the best collection of ants in the world.

DEPARTMENT OF MAMMALS

By Glover M. Allen

In spite of the fact that practically no field work has been undertaken for making new collections, a number of welcome additions have been obtained by gift, exchange or purchase during the year past. Grateful acknowledgments are made to the following for donations: — to the Director for a fine skull of the Florida Puma, West Indian bats, and a porpoise skeleton; Douglas Byers for a skull of the Sable Antelope from eastern Africa; H. A. Carter for a number of skins from Georgia; Dr. Herbert C. Clark for a large collection of bats in formalin from Panama; Karl Curtis for the skin of a water opossum; Dr. Cecil K. Drinker for the skeleton of a pygmy sperm whale; Field Museum of Natural History for specimens of Pipistrellus from Iraq: Donald A. Griffin for several well-prepared skins of *Myotis sodalis* from Vermont; J. Augustus Griswold, Jr., for two handsome Virginia Opossums from South Carolina and a series of small mammals collected by himself in Arizona; A Brazier Howell for 25 skins and skulls representing sundry races of small rodents of western North America, many of them new to the collection; Dr. Clyde E. Keeler for a specimen of a House Mouse mutant developed in the laboratory of genetics; Amory A. Lawrence for skulls of furbearing mammals from the Peace River region; Pedro de Mesa for a fine skull of the dugong from the Philippines; Dr. Earl H. Morris for the skull of an Indian dog from the Southwest; H. C. Paige, of the Engineering Department, for specimens of *Myotis lucifugus* from Squam Lake; James L. Peters for a shrew from Harvard, Mass.; Dr. Gouverneur M. Phelps for a number of interesting skulls of large mammals collected by himself in Kenya Colony, as well as others from New Brunswick; R. S. Pierrepont, Jr., for fifteen small mammals collected while with Dr. Strong's recent expedition to the Congo; Prof. William Rowan for an albino shrew (*Sorex*); Mrs. Dean Sage for several skins of local species; Dr. J. H. Sandground for several African specimens; Rev. George Schwab for a Cephalophus and a leopard skull from the Cameroons; Dr. Richard P. Strong for a handsome skin of a bush-buck from the Congo; F. E. Trotter, of the Board of Health, Hawaiian Islands, for specimens of the small rat native to the group; Dr. Neal Webber for several species from tropical America. In addition a number of bats were secured in the Bahamas by W. J. Clench, Russell and Huntington.

Exchanges have been made with the following for desirable species: — Boston Society of Natural History, Cleveland Museum of Natural History, Field Museum of Natural History, Musée d'Histoire Naturelle La Chaux-de-Fonds, Professor S. I. Ognev of the Zoölogical Museum of Moscow University, and Edward H. Taylor.

By purchase were received: — a small collection from the Aru Islands including specimens of a local species of phalanger and a topotype of the remarkable black-and-white striped marsupial, *Dactylopsila trivirgatus;* specimens representing four species of bats and a small rat from the New Hebrides, new to the collection; a small collection from Goyaz, Brazil, the first we have received from the central part of that country; finally, from Ward of Rochester, a fine skeleton of the jerboa, Scirtopoda, and some twenty skins selected from a miscellaneous lot sent for inspection.

With the able assistance of Miss Lawrence, all the African material secured by Mr. Loveridge on his last expedition (to Mt. Elgon) has now been catalogued and identified, and a summary report upon it prepared. Likewise the splendid collection of Amazonian mammals purchased last year from the Olalla brothers has been identified and catalogued. In all, over 1500 skins and skulls, chiefly of these two collections, were entered during the year in addition to over 550 bats in alcohol including a large part of those accumulated in several years past, but chiefly selections from the great collection forwarded from Panama by Dr. Herbert C. Clark. Of this last, a sufficient series was kept representing all the species, and the others were distributed to some other museums.

The larger skins from the Loveridge and Olalla collections, together with others from various sources, were sent to be tanned, in all some 290, which practically brings this work up to date.

The Assistant Curator, Mr. H. J. Coolidge, Jr., has continued his studies of the chimpanzee material which he has gathered from the leading museums in this country and in Europe. He has been twice to Philadelphia to study primate material both at the Academy of Natural Sciences and at the Zoölogical Garden. Under his supervision the exhibition room of holarctic mammals has been relabeled and further additions have been made in the relabeling of other mammal exhibits. By the addition of new hanging-racks in the room for storage of large tanned hides, he has increased its capacity by half, and has rearranged the skins so that they are no longer overcrowded. He has also helped in the organization of two expeditions that have brought in specimens. He has devoted much of his time to the work of the American Committee for International Wild Life Protection, of which he is Secretary. This Committee is about to publish its sixth research report, which includes a study of the national parks and game reserves of Africa, as well as the recent London Convention for African Wild Life Protection. At the request of President Conant, he has assumed direction of the Harvard Film Service which, with a staff of four persons, operates a motion-picture film library and laboratory as well as a projection service for the University. With the retirement of Dr. Wheeler, he was in charge of the organization of the course on the evolution of animal sociology (Sociology 16) in which both he and the Curator gave a number of lectures. He has also prepared, with the help of Museum colleagues, a report on the results of observations sent in on the behavior of animals during the total solar eclipse of August 31, 1932.

Commencing last autumn, the department has had the volunteer services of Miss Lee McKean, who has most devotedly given her assistance in various helpful ways. Much credit is due to Miss Lawrence and to her associate for the skill and care with which they have cleaned, numbered and labelled several hundred of the smaller skulls, representing most of the accumulations to date. They have also entirely re-arranged the greater part of the smaller skins in the storage cases, spacing them out and preparing new typed labels for the individual trays, thus greatly improving the availability and appearance of the collection. In addition Miss McKean has undertaken to arrange systematically on large cards the mass of pictures of living mammals that have gradually accumulated. Such a file, consisting chiefly of photographic reproductions, will form an interesting supplement to the museum specimens.

Other routine work has included a review of the exhibition collection, checking identifications as far as possible and cataloguing all specimens not previously registered. This has been chiefly done by Miss Lawrence with the help of Miss McKean.

With the part-time help of two undergraduates, assigned to the department, the work of entering in the card catalogue of the collection the accessions of several years past, has been nearly brought up to date, a vast convenience. Also the trays in the osteological collection have had brass label-holders of a uniform size tacked on throughout, preliminary to relabelling the entire series, a considerable undertaking which has been already begun.

A large part of the Curator's efforts have been devoted to the identification of the collections received last year from Africa and South America, as well as those of bats in alcohol from Panama and elsewhere. Two papers have been prepared, one with Miss Lawrence and Mr. Loveridge on the results of the latter's Mt. Elgon expedition, and a briefer one on Dr. H. C. Clark's Panama Chiroptera. A certain amount of time has been expended toward preparing a review of the species of Pipistrellus, now well under way. The work of identifying the collection of bats in alcohol, loaned for study by the Indian Museum is also nearing completion. With the help of Miss Lawrence, a checklist of African mammals has been undertaken, as part of a project to bring up to date the list of Recent mammals of the world. The manuscript of an account of the mammals of Mongolia and China, to which, through an arrangement with the American Museum of Natural History, part time has been given for several years past, was completed and turned in last autumn.

In addition to various activities already mentioned, Miss Lawrence has found time to make a preliminary study of the South American monkeys of the genus Callicebus, although the material now available seems insufficient for a final review. She has also made a further study of the relationships of the Hawaiian native rat with the aid of additional material she has been instrumental in securing.

During the year specimens have been loaned for study to five persons of other institutions. Two advanced students have also made use of the collections in special investigations.

REPORT ON THE BIRDS

By James L. Peters

During the fiscal year the department has received 2670 skins, a decided drop as compared with previous years, though to a certain extent compensated by the desirability of the material added. The accessions are made up from the following sources in the numbers given. Received in exchange, 160; Museum expeditions, 1013; purchase, 429; presented, 1068.

The expedition of the Harvard School of Tropical Medicine to the Belgian Congo returned with 216 specimens collected by Mr. R. Stuyvesant Pierrepont, Jr. Mr. Griswold has been working on this collection and finds that while it contains no novelties, there are a few forms hitherto unrepresented in our collection as well as some interesting records. Mr. Loveridge brought with him 196 skins collected by him in Kenya Colony and Uganda, this collection, together with that mentioned in last year's report, makes a total of 472 specimens. Mr. Loveridge and I have prepared a report on this collection which is now awaiting publication as a Museum Bulletin, in addition we issued advance descriptions of two interesting novelties. The joint Museum of Comparative Zoölogy and Museu Paulista Expedition sent in 600 birds, chiefly from Sao Paulo and Minas Geraës.

The larger and most important purchases are, — 164 skins of birds from Honduras, collected by C. F. Underwood and selected because of their desirability; 100 skins from Ward's Natural Science Establishment, chiefly from Australia and the Duke of York Islands; 67 skins from the Aru Islands and Dutch New Guinea; 40 skins from Espiritu Santo Island, New Hebrides.

To the generosity of a friend the departments owe 871 skins, including 634 birds collected by José Blaser in Goyaz and Minas Geraës; 200 more taken in Honduras by Raymond Stadelman; nine most interesting historic specimens, originally figured in Rowley's Ornithological Miscellany, and 14 skins bought from Professor Neumann, including the cotypes of three races of Sandgrouse recently named by him.

The Boston Society of Natural History turned over 160 specimens from the collection of the late Dr. C. W. Townsend; these birds were all from outside of New England, chiefly from Labrador. Small lots or single specimens were presented by C. W. Collins, J. A. Griswold, J. C. Greenway, Dr. Neil Webber, Dr. Carleton Coon, G. D. Boardman, J. L. Peters, Academy of Natural Sciences and the Raffles Museum.

There was a slight falling off in requests for loan of material as against last year, which was unusually heavy; the department made 29 loans to 19 different persons or institutions involving a total of 655 specimens. The prompt return of most of these loans is most gratifying.

A total of 6205 birds was entered in the card catalogue. This valuable adjunct to the department now contains about 93,500 entries or less than 40% of the total number of birds in the collection.

The number of our generic desiderata was reduced by two, through the receipt of the very rare Madagascan Owl, Heliodilus and a Prionopid from the New Hebrides, Clytorhynchus. Of the forms recognized in Sharpe's Hand-list we added 155 of our desiderata.

Mr. Griscom and Mr. Greenway have spent a great deal of time in thoroughly working up and studying the Olalla collection from Brazil and now have an important contribution to the ornithology of the lower Amazon nearly completed.

Mr. Griswold has relieved both Mr. Greenway and me of much drudgery in selecting exchange material and checking loans in and out; in addition he has done some "weeding" of the collection, remade old mounts, skinned birds brought in and instructed prospective collectors in the art of preparing a bird skin.

Miss Porter does all the cataloging, and carding; her work is a delight to the eye and a model of accuracy.

While there is always a considerable amount of correspondence and routine that cannot be delegated I have been able to find sufficient time for prosecuting work on the third volume of my check-list; the manuscript of this volume is now about 75 % complete and would be much more except for an illness that kept me out during the greater part of June and July.

Fred M. Packard was assigned to this department as student worker and brought with him a small knowledge of birds and much interest and enthusiasm in the work. His work was chiefly in carding a part of the Thayer collection.

The question of adequate case room for storing the collection without crowding and with a view to future expansion remains about the same, and will remain so until it is possible to find a fund sufficient for replacing all the dozen or more types and sizes of "Cambridge Cans" still in use with uniform wall cases. A number of slight rearrangements of the collection have been effected with a view to improving its workability.

REPORT ON THE MOLLUSKS

By William J. Clench

Expeditions. — During July of 1934, a collecting trip was made to the Great Smoky Mountains National Park for material needed for our North American collection. A series of 225 lots was obtained mainly in the vicinity of Mt. Le Conte on the Tennessee side.

Dr. C. V. MacCoy, Mr. H. D. Russell and the Curator spent the months of August and September in Cuba and on the west coast of Florida. Three weeks were spent at the Biological Station at Soledad working mainly in the vicinity of Gavilan and other areas distant from the station. A week was devoted to collecting at Viñales, in the Western end of Cuba. This last locality is one of the richest collecting regions in the world for land mollusks. This trip was made mainly for Liguus and certain Operculates which exhibit a vast amount of variation at this place. The return trip along the west coast of Florida was made to augment our large series of Gulf littoral mollusks from new stations.

Dr. Bequaert accompanied the Second Harvard African Medical Expedition to the Belgian Congo from April to September 1934. A very large series of both land and freshwater mollusks was obtained and donated to the Museum by Dr. Bequaert.

Collections.—In addition to the collections obtained from the above expeditions, the following are deserving of special note. About 100 lots of western Cuban land shells were purchased from Sr. J. Armenteros. This material was in superb shape, with detailed locality data and nearly all obtained in places new to our own Cuban collections. To C. de Villiers we are indebted for a large series of South African marine and land shells. The latter were of particular value as coming from a section of South Africa from which we have had little or no material previously. To Dr. Michael Bequaert, we are indebted for a collection of Central African mollusks, numbering over 500 lots. Mr. A. Loveridge added over 150 lots of African mollusks obtained on his recent trip to the east central portion of the continent. Dr. P. J. Darlington collected a small but extremely valuable series of land shells in Hispaniola. All of the material was from new regions and many species are new to science. As in previous years, much material has been received from C. Goodrich, H. A. Pilsbry, S. T. Brooks, P. de Mesa and Miss W. McGlamery, mainly through exchange. To Dr. C. M. Cooke we are indebted for a series of Soloman Island land shells obtained by the Crocker Expedition.

The Curator is particularly indebted to Messrs. Archer, Banks, Bequaert, Cheever, Foster, and Russel for much volunteer work with the routine of the department and to Mr. McLean for his full time volunteer work with the revision of the marine bivalves. Much credit is due him for his painstaking care in the arrangement and study of this neglected class of mollusks.

Out student assistants, G. Wagner and B. F. Merriam have given excellent service during the past year and have accomplished a great deal of work.

The Curator would personally like to express his thanks here to those named above for willingness and cooperation in the work of the department as well as to many others who have added to the material wealth of the collection by donating specimens.

Revisional work has continued throughout the past year. The large increase in the new species to the collection has been mainly due to large amount of African material obtained directly and indirectly by Dr. Bequaert. Our African series is probably only equalled by the British Museum.

A resumé of the collection follows:

Number of accessions for the year	4,723
Catalogued entries in the collection	87,471
Number of species in the collection	22,918

REPORT OF THE RESEARCH CURATOR OF ZOOLOGY

By Ludlow Griscom

For the first time in several years I can begin my report without having to mention a further decrease in the funds of the Museum. We seem to have reached rock bottom at last, and while we stayed there, the descent into Avernus has been checked. It was by no means difficult, therefore, to conclude the financial year with a substantial saving, about the same amount under the deficit allowed as the preceding year. Even this would have been impossible, however, without some increase in private outside assistance, and no one should suppose that the Museum's finances are improved merely because they have not become worse.

Perhaps the most satisfactory situation in those activities of the Museum with which I have some concern is the state of our publication, probably better than that of any other large museum in America at the moment. While the general finances of the Museum are greatly embarrassed by the high percentage of our funds restricted to special purposes, we do happen to have a publication fund that is almost adequate to take care of the normal output of our scientific staff. Thanks to long range planning on Dr. Barbour's part some years ago, we have now but one extensive memoir remaining of the unfinished Blake and Albatross reports, and this will be ready for the printer before this report is issued. The past year no large and expensive memoir was printed, enabling us to publish an unusual number of Bulletin articles, thus greatly reducing the arrears which had accumulated in this series.

The year was pleasingly varied in research work. Immediately after my return from Europe in August, 1934, some weeks were devoted to completing two papers on the birds studied in the museums of London and Paris. Work was then begun in earnest on the Olalla collection from Brazil and Mr. Greenway and I spent many happy hours together in the bird room. The identifications were completed during the spring. A very few new forms were found, but the collection abounded in rare and little known species and proved to contain a very fine percentage of the known avifauna of the Lower Amazon Valley. It seemed well worth while, therefore, to seize the opportunity of preparing a report that would include a complete summary of our present knowledge of the extensive and variegated bird-life of the region. Mr. Greenway and I are still engaged in the mass of compilation and the bibliographical researches required, as well over a thousand named forms are involved.

In the late afternoons, Saturdays and holidays I was again privileged to assist Professor M. L. Fernald in continued studies on the flora of southeastern Virginia. One paper was issued during the year, including revisions based on my study of types the preceding summer in Europe. This section of Virginia was visited by Clayton 2 centuries ago, and many of our commonest plants were formally described by Linnaeus, based on Gronovius' report on Clayton's collections. No systematic collection of the plants of this most important type region has ever been made since Clayton's time and it is astonishing the degree to which it has been erroneously assumed that common plants of the northeastern States are the same as those collected by Clayton. Another paper awaits the study of further types in Europe now being made for us by Mr. Weatherby. The results of our first study showed the need of thorough collecting in this part of Virginia and accordingly I joined Professor Fernald in two field trips, one in early May and the second in mid June, when plants of two wholly different flowering seasons were secured in quantity. These await critical study the coming year.

Active local field work and also contact with local bird organizations were continued as usual. The year 1935 will probably go down to history as one of the best and richest years for birds ever known in eastern Massachusetts.

Some inroads on Museum time were required in the fall by my duties as a freshman adviser. The usual quiet summer was radically altered by my offering a course in field ornithology in the summer school. The planning of the course, the preparation of the lectures, and the scouting trips required to determine advantageous places to visit with the class, effectually prevented any activities other than the usual administrative and editorial ones.

REPORT ON REPTILES AND AMPHIBIANS

By A. Loveridge

The first four months following my return on September 7, 1934 were exclusively devoted to routine duties. Over 4,000 accessions were entered in the departmental catalogues and each entry transferred to the card-indices which continue to prove their usefulness, not only to the department, but as a boon to visiting herpetologists who are pressed for time. Despite much synonymizing, the census of recognized forms shows a gratifying increase of 193 species and 9 genera.

The chelonia, snakes, and majority of lizards resulting from my visit to East Africa in 1932–33 have been studied and incorporated in the collection, the amphibia are still untouched. A preliminary report comprising the descriptions of fourteen new forms has been published as a Museum bulletin. A report on the herpetology of the Vanderbilt-African Expedition of the Philadelphia Academy has been drafted, but cannot be completed until the final shipment of material is received.

My colleague, Mr. Benjamin Shreve, alone, or in co-authorship with the Director, has published several papers describing novelties from the Bahamas, Panama, Ecuador and Paraguay. I am deeply indebted to him for identifying a tremendous amount of neotropical material in conjunction with his studies.

I take this opportunity of expressing my appreciation of the generous help afforded by another volunteer worker, Mr. Henry Day, who, for a period of seven weeks during the summer, contributed his services in the mornings. He packed up outward-bound loans and unpacked and bottled incoming collections. Together we checked and completely overhauled the whole of the extensive collection of fence lizards (Sceloporus spp.) which occupy thirty trays. Entirely fresh alcohol was supplied to the group, the old preservative was poured off and tested with the alcoholometer. It was found to have lost 15% of its alcoholic content, being only 60%.

The student aid was only available for part time so that the replenishing with alcohol of the jars in the study collection has fallen somewhat in arrears. Mr. Day went over the whole of the amphibia and began the lizards. Tagging the 4,000 accessions and some repainting, occupied the remainder of his time.

It is difficult to single out for mention the more important accessions, but one of outstanding interest was that brought back from Haiti by Dr. P. J. Darlington which resulted in a new genus and several interesting forms that have been described by Dr. Doris Cochran. The material resulting from Mr. R. E. Stadelman's extensive collecting in the mountains of Honduras has been studied by Mr. K. P. Schmidt and this material also has furnished many novelties.

Exchanges were arranged with twenty-two institutions and resulted in 220 additions of which a high percentage were species new to the collections. It is becoming increasingly difficult to arrange exchanges on the extensive scale of a decade ago.

Thirty loans of specimens have been made to eighteen individuals. This material was borrowed by workers at the American Museum of Natural History, British Museum, Michigan University Museum of Zoölogy; Dr. E. R. Dunn, Mr. L. M. Klauber and others.

There has been a falling off in the number of herpetologists who have visited the Museum to study the collections; among those who have done so, however, one might mention Dr. H. L. Babcock, Dr. C. E. Burt, Major Chapman Grant, Mr. Norman Hartweg, Dr. L. C. Stuart.

A census of the collection follows:

	Genera	*Species*	*Gain Genera*	*Gain Species*
Rhynchocephalia	1	1	0	0
Crocodilia	8	23	0	0
Chelonia	61	203	0	2
Lacertilia	283	2,088	5	68
Ophidia	300	1,491	0	76
Amphibia	221	1,534	4	47
	874	5,340	9	193

REPORT ON INVERTEBRATE PALEONTOLOGY

By Percy E. Raymond

The discovery of more new trilobites in northern Vermont forced the curator to spend some time in adding to a paper which was mentioned in the report last year. This material will be added to our collections. Considerable progress was made on a report on the stratigraphy and correlation of the Ordovician formations of northeastern North America for the Committee on Stratigraphy of the National Research Council, and a report on the paleoecology of Paleozoic arthropods was furnished to the Committee on Paleoecology of the same organization. Considerable time was occupied by his duties as President of the Paleontological Society and as a Vice President and Councillor of the Geological Society of America.

The curator and Mr. Schevill spent July and August of 1934 in making collections from the older Paleozoic strata of Norway, Sweden, and Esthonia, in the hope of facilitating comparison between American and northern European faunas. This trip was supported by a grant from the Milton Fund. The greater part of the time was spent in Esthonia, where large collections were made from the Ordovician and Silurian. Our especial thanks are due to Professor A. Öpik of Tartu University for advice and assistance in reaching the most fossiliferous localities, to the Director of the State Oil Shale Industry, and to Chief Chemist Karl Luts for special assistance at Kohtla-Järve, and to Mr. Ernst Seeberg of Kihelkonna for much information. Worthy of special mention are the collections from the Kuckers (oil shale) at Kohtla-Järve, the Ordovician cephalopods from Joa Falls, and the Silurian ostracoderms from Pilguse, the locality on Oesel discovered by Dr. A. Luha and later worked estensively by the late Professor William Patten.

For assistance in Sweden we are indebted to Dr. A. F. Westergaard and Dr. Gustaf T. Troedsson. The principal collecting was done in northern Oeland.

Through the kindness of Professor Olaf Holtedahl, Dr. Leif Stoermer, and Dr. Trygve Strand, we were able to secure collections from the Cambrian, Ordovician, and Silurian of the Oslo and Ringerike districts, supplementing material obtained by the curator twenty years earlier.

Dr. F. H. Carpenter, also through the aid of a grant from the Milton Fund, spent three months in the summer of 1934 collecting insects from the newly discovered locality in the Miocene strata at Creede, Colorado, and in the Eocene shales of Utah. About 7000 fossil insects were discovered at these localities. Mr. Carl Parsons, an undergraduate in the College, was an efficient assistant on this trip. Thanks to Dr. Carpenter's efforts, our collection of fossil insects is rapidly becoming one of the largest and most important in the world.

An unusual number of invertebrate fossils have been given us this year. A list of the donors is appended. We are indebted to all of them, but special mention should be made of a few of the collections.

Dr. J. A. Cushman presented 960 species of Foraminifera, all mounted and labeled, in a cabinet. Mr. Edward S. Mallinkrodt, Jr. defrayed the expenses of the mechanical labor involved in the preparation of the collection. These are almost the only authentically identified Foraminifera that we have. We are very thankful for them, and trust that some arrangement can be made by which the collection will be increased.

Dr. Bradley Patten presented 16 drawers of Eurypterids, collected by his father at the famous locality near Kihelkonna, Oesel. Mr. Fred B. Phleger contributed three drawers of Ordovician fossils from the type localities of the species which he described from the Inyo Range in California. Mr. Frederick Thompson continues his gifts of rare arthropods from the Pennsylvanian, and Mr. W. C. Darrah has donated his entire collection of invertebrate fossils, giving us a good representation of the Carboniferous of western Pennsylvania. Mr. C. H. Burgess kindly turned over his collection of Paleozoic and Mesozoic fossils from the Rocky Mts., of northern United States and Canada.

Mr. H. C. Stetson, with a specially devised dredge, succeeded in collecting fragments of fossiliferous rock from the walls of a canyon on the southern slope of Georges Bank. Although fossiliferous pebbles have been dredged by fishermen from time to time, this is probably the first successful attempt by a geologist to collect fossils at great depths, beyond the continental shelf. The species have been studied and described by Dr. Lloyd W. Stephenson. The results will soon be published and the specimens deposited in the Museum.

The collection of fossil insects has grown to such an extent that Dr. Carpenter had to move into a larger room during the year. This provided an opportunity for a complete rearrangement of the collection, and affords room for some expansion.

The cataloguing of the types in the Scudder collection was completed, and considerable progress made on the study of the insects from Creede. The eighth part of the series of papers on the Permian insects of Kansas is in preparation, and a revision of the Recent and fossil Raphidiodea of North America has been completed.

Mr. Schevill has continued his work among the cephalopods, with particular emphasis on the cataloguing and arrangement. A great deal of time has been devoted to the task of straightening out the confusing duplication of entries in the older catalogues; although much has been accomplished, a good deal remains to be done. Considerable progress has also been made in the cataloguing of the trilobites and the labeling of types in various groups.

In addition to his regular duties, Mr. Schevill has begun the filing and cataloguing of the Museum's rather extensive collection of pictures. This includes many of the originals of published plates and figures, as well as a great many unpublished drawings and paintings. Some of the latter are of great scientific value, including, among others, the Andrew Garrett collection of water color sketches of Pacific fishes. Various members of the Museum staff have been very helpful in identifying unlabeled pictures.

As usual, advanced students availed themselves of the opportunities which our collections offer for research. Dr. Vladimir J. Okulitch, who was supported by a fellowship granted by the Royal Society of Canada, spent the year in studying corals and Archaeocyathinae. He prepared two papers, based largely upon our material, which have been accepted for publication. Dr.

David M. Delo and Dr. Cecil G. Lalicker published articles on our trilobites in the Journal of Plaeontology, and Mr. Fred B. Phleger described some of our Russian cystids in the Bulletin of the Museum. It was our privilege to have Professor Armand Hacquaert of the University of Ghent spend some time in the study of our rather unusual collection of Bohemian specimens of Pachytheca.

Accessions:

By donation from: Messrs. Richard Foster, Bradley Patten, Frederick Thompson, Fred B Phleger, H. J. Sawin, E. E. Halvorsen, W. C. Darrah, Richard C. Brown, C. H. Burgess, James Zetek, T. L. Hallenbeck, L. I. Price, A. F. Gray, Claude Albritton, Jr., J. A. Cushman and E. S. Mallinkrodt, Jr., Joseph Tratnyek, C. M. Barber, Erling Dorf, E. W. Berry.

By exchange from: The Western Australian Museum, Tallinn Museum, Messrs. H. H. Finlayson, E. P. Chace, P. P. McGinty, S. R. Williams, Maxwell Smith.

By purchase of: C. A. Orr—Mississippian from Carthage, Mo.

By collection: Eocene and Miocene of Utah and Colorado, F. M. Carpenter; Cisco of Texas, A. S. Romer; Ordovician of Missouri and Permian of Texas, T. E. White; Miocene of Maryland, W. J. Clench; Ordovician of Vermont, P. E. Raymond and F. B Phleger; Cambrian. Ordovician, and Silurian of Estonia, Sweden, and Norway, P. E. Raymond and W. E. Schevill.

REPORT ON VERTEBRATE PALAEONTOLOGY

By Alfred S. Romer

Much progress has been made during the past year in the collection, preparation and study of vertebrate fossils. The most notable new advances have been made in the field of reptiles and amphibians.

The Museum already possessed a small but interesting collection of Permo-carboniferous reptiles from the southwestern "redbeds." In the spring of 1934 Mr. L. I. Price began the collection of material in the Texas redbeds for this museum, and was joined during the summer by Dr. T. E. White; collecting is being continued during the present field season. The materials brought back from the 1934 season's work probably constitute the finest single collection ever gathered from these beds. They include more than half a dozen skulls and much skeletal materials of *Eryops;* five skulls of the previously rare *Trematops;* two skeletons of *Parioxys,* previously known only from the type skull; excellent material of *Dissorophus;* numerous skulls of *Diplocaulus;* type material of a new amphibian genus, two good specimens of *Diadectes,* a *Labidosaurus* skeleton, the first discovered skeleton of *Helodectes,* the skull of an entirely new type of cotylosaur, and much valuable pelycosaur material including one or two new types. The find of most general interest was that of a Permian egg, the oldest reptilian egg known, of an antiquity about twice that of the renowned dinosaur eggs which had previously held the age record. Of this material a string of *Eryops* vertebrae is already on exhibition and skeletons of *Edaphosaurus* and *Dimetrodon* are being prepared for mounting.

As a result of this work the Museum now has a Permian collection exceeded in morphological value only by that of the University of Chicago.

The past spring White and Price explored some of the Permian and Triassic beds of New Mexico. Their most interesting find was that of a postcranical skeleton of a phytosaur with the bony armor in position.

During the year Doctor White has successfully undertaken the very difficult task of removing the hard matrix enclosing the skull of the giant Australian plesiosaur *Kronosaurus.* The skull has a length of approximately 10 feet, unquestionably a size record for plesiosaurs.

A skeleton of a Pierie mosasaur was collected in Goshen Hole, Wyoming, by Dr. Schlaikjer during the 1934 field season.

Mr. C. N. Barber of Little Rock, Arkansas, has been exploring the marine Cretaceous of that State for vertebrate remains during the past two years. The Museum has extended him a limited amount of assistance and has received from him, among other materials, the shell of one of the large sea turtles.

Work has continued actively on the collection and preparation of fossil mammals. Dr. Schlaikjer continued his work in the Goshen Hole region of Wyoming in 1934, his most notable find being a partial skeleton of a tapir, the first specimen of the kind discovered in the American Miocene. Mr. Henry Seton, again working in the Eocene of Wyoming, discovered a skeleton of the early titanothere *Palaeosyops,* which he is preparing. A suite of dentitions of European mammals has been purchased from Wards, and a small collection of tertiary mammals from Nebraska from Mr. Robert Witter, this including a skull of the rare *Hypisodus* and interesting rodent material. By exchange we have received from the Geological Survey of China a fine series of specimens representative of the Pleistocene of that country.

The most important addition of the year to the mammal collection was the purchase from Dr. E. L. Troxell of Trinity College of an almost complete skeleton of the large Eocene ungulate *Coryphodon,* now in course of preparation. This skeleton is unique, our previous knowledge of this animal being based on fragmentary remains.

The *Parahippus* skeleton, likewise unique, has been placed on exhibition in a striking panel mount by Mr. Nelson. This type of mount, as executed by him, has proved so superior to the "open" type of mount that he is now engaged in remounting a number of skeletons already on exhibition. The two *Mesohippus* skeletons have already been transformed into fitting companions for *Parahippus,* the little camel, *Stenomylus,* has been remounted and others are undergoing metamorphosis. The excellence of their present appearance cannot be exaggerated.

The recataloguing of the fish collection has been completed by Mr. Cummings under Mr. Stetson's direction. A number of the carboniferous types of St. John and Worthen have been brought to light. A considerable amount of Permian fish material has been found during the course of recent collecting trips in Texas.

A new case has been installed in the exhibition halls to house the horse collection. It is planned to use the northwest room on the ground floor for the storage of vertebrate fossils. The external sides of the room are lined by tables for the use of staff members and advanced students using the collections. One row of storage cases has been already built; this now houses the fossil reptiles (exclusive of footprints.)

Mr. L. I. Price has joined the staff as Research Assistant. Mr. Robert Witter has been employed in preparation since January.

Dr. White has continued his *Seymouria* studies. Mr. Price is engaged in the investigation of the braincase of cotylosaurs, particularly *Captorhinus*. The curator has completed a study of the faunal sequence of redbeds vertebrates. A comprehensive work on pelycosaurs is well advanced. It is hoped that this may be the first of a series of three memoirs, based in great measure upon material in this Museum, which will bring our knowledge of American Permian vertebrates up to date.

During the year we have had the pleasure of several visits from Dr. W. B. Scott of Princeton, who has studied our White River mammals in connection with the preparation of his monograph on these beds. Dr. A. E. Wood has studied the rodent material, reporting many interesting specimens and Doctors C. L. Camp of California and E. Olson of Chicago have studied our Permian and Triassic materials.

In contrast with the situation in all the other major universities, vertebrate palaeontology has not in the past been a recognized field for graduate work here. In consequence our fossil collections are still far from being well rounded out for advanced teaching and research purposes, despite the notable progress made in recent years. Efforts to fill up the gap caused by lack of interest in earlier years as well as to keep abreast of current advances is made difficult by the fact that it is hard to crowd this extra field into an already heavily taxed Museum budget. In consequence almost all support for this work must at present be obtained from extra-budgetary sources—special gifts and occasional grants from other university funds or from extra-mural research institutions. Such support is, of course, in general of a purely temporary nature.

REPORT ON HELMINTHOLOGY

By J. H. Sandground

Since returning last November from the Belgian Congo where I served as helminthologist on Professor R. P. Strong's recent expedition for the study of Onchocerciasis, most of my attention has been given to the study of an extensive collection of worms that were secured from a wide range of hosts. This material has contributed much towards filling in some of the lacunae, representing families and superfamilies, that still mars the balance of our taxonomic card-index system.

As was to be expected, a considerable number of parasites collected in the Congo where helminthological collecting has not been actively prosecuted, appear to be new, and when described will further increase our growing list of types.

More recently, through the interest of the director, Dr. Schouteden, we have been entrusted with the identification of a large collection of parasitic nematodes that have been accumulating in the Congo Museum at Tervueren, Belgium. To reciprocate the gift of duplicates from this collection we plan, so far as the nature and the amount of material available permits, to present paratypes of new species emenating from the Congo to the Congo Museum. This appears to be a most appropriate institution in which to deposit valuable types of species whose permanent preservation is always attended with great risk.

During the year under review our catalogue shows a very appreciable increase in the size of our helminthological collection which is now in the neighborhood of a thousand accessions. In certain groups our collection is so comprehensive that requests are being received from workers in outside institutions for the loan of material. Dr. Louis van den Berghe, parasitologist at the Prince Leopold Institute of Tropical Medicine in Antwerp spent the month of June with us working over some of the more difficult species in his own collection.

This year we received a very desirable collection of parasites from the Philadelphia Zoölogical Garden which were identified for the Society's pathologist.

We are also greatly indebted to Professor P. A. Maplestone of the Calcutta School of Tropical Medicine who presented us with paratypes of about forty new species of nematodes described from animals that died in the Calcutta Zoo.

We also have to thank Mr. Arthur Loveridge who, with his usual zeal, collected a large number of parasites on his last expedition to Kenya and Uganda.

In some groups where our collection is poor in forms for comparison it has been our policy to refrain from identifying specimens and, if practicable, to pass the material on to special authorities in the group. This year a new species of the peculiarly difficult cestode genus *Avitellaria* was described for us by Dr. W. N. F. Woodland of the Wellcome Bureau of Scientific Research, London.

Dr. Jean G. Baer of the Natural History Museum in Geneva, Switzerland, has undertaken the study of the tapeworm material collected by Dr. Ralph Wheeler on the Kelley-Roosevelt Expedition to Indo China on which he is now collaborating with Professor Ch. Joyeux of Marseilles.

REPORT ON FISHES

By N. A. Borodin

Type specimens.— The card catalogue includes at the present time 1232 cards (64 more than in 1934).

New accessions.— A collection of Brazilian fishes brought by Mr. B. A. Krukov, consisting of 83 specimens (including 2 paratypes) has been donated by a friend of the department. Several skins of large South American fishes received from Mr. J. Blaser.— 16 specimens (including 3 types) have been donated by Dr. Howell Rivero. Other accessions were: 57 specimens from Leiden Museum (in exchange), 33 specimens from G. S. Myers (in exchange), 12 specimens from W. S. Schroeder, 1 from Dr. V. Vladykov, 1 from S. Kennard, 1 from F. S. Firth, 6 from A. Loveridge, 4 from N. A. Weber, 1 from Boston Museum of Natural History (in exchange).

Some steps have been made toward a large exchange of Museum of Comparative Zoölogy duplicates of South American Loricarioids and catfishes with the Philadelphia Academy of Sciences, which offers Chinese and some other Asiatic fishes. A list of 377 duplicates of Museum of Comparative Zoölogy fishes available for exchange is already prepared.

The Museum mailed, by request of the Biological Laboratory of Kiev (Russia), several specimens of *Polyodon* for anatomical studies. In exchange the institution promised to send some fishes from the Black Sea. By request of the Director of the School of Arts of the Boston Museum Mr. Takovleff of this Museum donated several stuffed fishes, one cast and two skulls.

Loans.— Our flat-fishes of the family Soleidae, reloaned by British Museum, have been identified by Dr. P. Chabaneau of Paris Museum. They are not yet returned. Another large collection of Plectognath fishes, loaned to the British Museum for Mr. Frazer Brunner last year is still in use and not returned. A complete list of other loans, still retained by the borrower, has been published in the Annual Report for 1933–34 (p. 46).

Visitors.— Professor W. J. Longley visited the Museum in September and December for a few weeks. He is studying the

Fishes from Florida. Dr. Howell Rivero from Havana, Cuba, on a Guggenheim Fellowship, started the work on Cuban fishes in October 1934, worked in this Museum during the winter of 1934–35 and plans to continue his studies in 1935–36.

Research work on the anabiosis of fishes has been resumed.

REPORT ON THE FOSSIL ECHINODERMS

By Robert T. Jackson

What time the Curator was able to spend at the Museum was given largely to the fossil Echini, especially the Spatangoids. Much time also was spent on revising and labelling adequately the large collection of casts of fossil Echini received by the Museum in the Louis Agassiz Collection in 1859. A statement in regard to this collection seems worth recording.

When Agassiz was Professor of Natural History at Neuchatel he brought together by collecting, and from various Museums and private collections a great number of Mesozoic and Tertiary Echini which were the basis of his publications on that group. Many of these specimens were described as new, or were the types of other authors. In order to distribute representatives of this valuable material to Museums and collectors, Agassiz had made an extensive series of casts of types and selected material. These he offered for sale, or exchange. Following Agassiz his associate E. Desor continued the work of having casts made, so that the series is known as the Agassiz and Desor collection of casts.

J. Lambert and A. Jeannet, in 1928, published a critical memoir of 233 pages, with two plates, cataloguing this collection. They enumerate 961 casts, of which 958 are of Echini, two are of crinoids and one of an asteroid. Over 900 of these casts have been located in the Museum collection. The casts have numbers, or letters with numbers, incised, and as such are recorded in Agassiz's Catalogus systematicus, 1840, Agassiz and Desor's Catalogue raisonné, 1846–7, Desor's Synopsis des échinides fossiles, 1858, and some other publications. The collection of casts therefore has a very considerable historical interest, and as very largely representing types is valuable for comparison.

As gifts the Museum has received from Prof. U. S. Grant of the University of California, a choice *Echinoneus burgeri* Grant and Hertlein, paratype, from the Oligocene of California, also three specimens of *Dendraster diogoensis* Kew, from the Pliocene, California. From E. E. Halvorsen was received six specimens of *Dendraster coalingensis* Twitchell, from California. W. C. Darrow gave a choice specimen of *Hyattechinus pentagonus* Jackson, from Erie Co. Penn., a new locality for that rare Palaeozoic Echinoid. From Chalmers Roy were received three blastoids and four crinoids, from the Burlington Limestone, of Hannibal, Missouri.

A cast of the type of *Asterostoma excentricum* (Lam.) was loaned to Dr. Sanchez Roig of Havana, Cuba, and has been returned. A choice specimen of *Sanchezaster habanensis* Lambert, from the Oligocene of Cuba, loaned to the late F. A. Bather and described by him in a posthumous paper on Cheilonechinus, Bull Geol. Soc. Am., 1934, has been returned by the British Museum.

REPORT ON COELENTERATES, WORMS, ETC.

By E. Deichmann

A large amount of time has been spent in bringing order into the huge collection of segmented worms, stored in the basement. With the assistance of Mr. A. Russell, the marine worms have been sorted out and arranged alphabetically, and to some extent catalogued and relabelled. A great handicap has been the faded, almost illegible condition of many of the older labels. Aside from a large number of jars with unidentified material, which has been arranged according to locality, the material consists chiefly of the "Blake" Expeditions' material from the West Indies, and the Albatross Expeditions' material from the Pacific Ocean. In both cases the collections contain numerous types and much rare material. On the other hand many of the most common species are practically absent, but this deficiency may soon be remedied through exchange with other institutions. The comparatively small collection of earthworms has been arranged and catalogued by Mrs. Karl M. Pattee, with the help of Dr. G. E. Gates, who worked in the M. C. Z. through the greater part of the year.

As a result of last years visit to Europe the collections of Sponges and Coelenterates have begun to increase through exchange. A collection of sponges, typical of the North Atlantic region, and up to date as regards nomenclature, is under way, in exchange for a set of West Indian sponges, sent to the British Museum (Dr. M. Burton). Stony corals as well as Octocorals, from the coast of Scandinavia, freshly collected and with exact locality and depth will arrive from the Zoölogical Museum in Bergen, Norway (Dr. A. Brinkmann), and the Zoölogical Museum in Gotenburg, Sweden (Dr. L. A. Jaegerskiold). The Zoölogical Museum in Brussels (Dr. van Straelen) has received a small, selected set of typical West Indian stony corals and in exchange we have received a number of rare East Indian Gorgonians, (from King Leopold's Expedition, identified by Dr. I. Dean) not represented in the collections here, or in Washington.

From the U. S. National Museum an unusually large number of Pennatulacea has been received in exchange, mostly Pacific forms.

The huge collection of material of the widespread genus Acropora, the staghorn corals, is being worked over, in small instalments, by Dr. Jan Verbey, den Helder, Holland, and part of the material which he identifies will be deposited in Holland, while the M. C. Z. will receive a number of colonies from the East Indies. Dr. S. J. Hickson, Cambridge, England, has re-classified our Melitodidae as part of his revision of that family, and part of the material examined by him, has been donated to the British Museum.

The establishment of such identical, standardized collections in Europe and in U. S. A. aid in avoiding many errors of wrong identification.

In the exhibition rooms the Synoptic Room has received much attention. New exhibits of deep sea deposits and of plankton forms have been installed. The lower and higher worms have been re-arranged and the text of the labels enlarged and brought up to date, with the assistance of Dr. G. E. Gates, for the earthworms, and Dr. J. Sandground, for the parasitic worms.

Many labels have been printed by Mr. L. Milne. Particularly valuable has been the addition of a set of glass models of Protozoans. It has completely changed the appearance of the case which contained this hitherto somewhat neglected group and has greatly added to the instructive value of the Synoptic Room.

There have been prepared, for publication, a revision of the Pennatulacea of California (including the material from the west coast of Central America which Studer treated in a preliminary account in 1894); a report on the Pennatulacea from the Bingham Expedition (Caribbean Sea and Gulf of California; and a review of the Arctic species of Molpadia (Holothurians).

As gifts have been received: a seapen from Lower California, from Dr. L. Walford (Fleishmann's Expedition 1935); various seapens from the Caribbean Sea and Gulf of California, from the Bingham collections, Yale; some stony corals, from Florida, from Mr. D. J. Zinn.

The collection of Hemicordata has been enlarged through 14 jars of Salpae, Grampus (Bache), through Dr. H. B. Bigelow, and a specimen of a Balanoglossus from Mexico, from Mr. S. Glassell, Beverley Hills, California.

The curator spent a week in Washington in June, studying Pennatulacea in the U. S. National Museum. Dr. and Mrs. J. E. Hoffmeister spent a day in the M. C. Z., examining stony corals.

REPORT ON THE CRUSTACEA

By Fenner A. Chace, Jr.

Since taking charge of the collections on October first, my time has been given largely to checking the identifications, relabeling, and starting a new card catalogue for all the collections. Since it was deemed necessary to write new labels for practically all of the specimens, this work has proceeded very slowly. Now, however, 231 genera and 769 species of crabs contained in some 2500 lots, which is about four-fifths of the brachyuran collection, have been examined and incorporated in the new catalogue. This check of all specimens has disclosed a number of types which had heretofore been overlooked. In addition, a copy of the classification of the Crustacea including all the genera has been made from the list kindly loaned for that purpose by the United States National Museum, and from this a card catalogue of the genera, including discarded names, is being made. When completed, it is felt that these will aid materially in locating specimens, especially during the absence of the curator. Much of the credit for the work accomplished during the year is due to Mrs. Karl M. Pattee who has given invaluable assistance in cataloguing specimens during the time available.

Two weeks at the end of July were spent on board the "Atlantis" of the Woods Hole Oceanographic Institution tow-netting northwest of Bermuda near the Gulf Stream.

By far the largest lot added to the collections during the year was the African material collected and donated by Mr. Arthur Loveridge. These specimens which have been examined and described by Dr. Mary J. Rathbun included 243 specimens of 12 species of crabs, of which 2 proved to be new species, 2 specimens of 2 species of hermit crabs, and 3 specimens of 3 species of shrimps. Other additions for which thanks are due have been received from: Dr. Thomas Barbour, Dr. Hubert Lyman Clark, Mr. William J. Clench, Dr. Elisabeth Deichmann, Mr. G. Robert Lunz, Jr., and Dr. H. M. Novella.

REPORT ON THE LIBRARY

By Eleanor S. Peters

Various problems have come up recently in the library which are the result of its growth in recent years. Chief among these is the crowded condition of our card catalogue—there is now only little room for further expansion and in another year or two it will be inadequate. When this catalogue is added to or a new one built in its place, we should consider using the standard size card instead of the smaller size now in use, and also should consider typing cards instead of writing them by hand.

We have outgrown the cases used for our "treasure books" and have had to move these to other temporary shelves. They should be in a fireproof case, however.

With the increased facilities for the study of biology at Harvard and the additions to the Museum staff during the last few years, the demands on the library have naturally increased. While no annual count of circulation was made previous to 1929–1930, it is certain that circulation has doubled in the last ten years. The mere mechanical work of lending books and receiving books returned takes the greater part of one person's time during the college year, to say nothing of the reference work. During the past year the library has been fortunate in having again, as a part time student worker from the college, Mr. Paul Allen; this being his second year in the library he was familiar enough with its arrangement to assist in returning books to the shelves and filing current journals. Good use could be made of such help from a full time worker.

In January we undertook a much-needed revision of the exchange list for the Museum's publications. This work has been done at odd times when regular routine allowed and is not entirely completed yet. Many wrong addresses have been corrected, a number of institutions no longer publishing material to send us have been removed from the list, and a few exchanges have been resumed which were interrupted because of errors in the list. There are at present 343 names of institutions and societies receiving some or all of the Museum publications and sending theirs in return.

Many generous friends have continued to give books, reprints and journals to the library, and the usual transfer from the Harvard College Library and various departmental libraries have been received. A most useful reference work was purchased by a friend of the library: F. E. Schulze's "Nomenclator Animalium Generum et Subgenerum" published by the Prussian Academy and covering literature from 1758 to 1922. We have brought up to date the library's set of the "Fauna of British India"and have purchased a complete set of "Coleopterologische Rundschau" and of the "Paleontologische Zeitschrift." The Geological Society of America has made this library a depository for its publications, which we previously have had to purchase.

During the year the three members of the library staff have attended meetings of the Harvard Library Club, organized a year ago; these meetings were held in the various libraries of the University and have afforded opportunity to see these and learn about their contents. We were also interested this year in the Boston Meeting of the Special Libraries Association in June, for which we helped to plan the program for the Museum Group.

Four hundred and seventeen volumes were bound in the year, chiefly current serials. There is a large number of old works, some of them rare, whose bindings ought to be restored; because these are infrequently used we keep putting them aside and, necessarily, spend our binding funds for the recent serials. The work on the old books will be more costly but will be money well spent when it is available.

The year's total circulation is 7,033—the museum staff borrowed 1,538, students and professors 5,418, and other libraries 77. About 150 books were on reserve during the two reading periods, and for the first time we reserved books (about 30) for a course given in the Summer School.

Accessions from August 1, 1934 to July 31, 1935 were 1,077 volumes and 1,805 pamphlets; the present total is 76,137 volumes and 94,868 pamphlets.

PUBLICATIONS

FOR THE YEAR 1934–1935

(1 August, 1934—31 July, 1935)

Museum of Comparative Zoölogy

Publications.—The following have been printed during the year.

Bulletin:—

Vol. LXXVI

No. 2. Contributions to the Stratigraphy and Palaeontology of the Goshen Hole Area, Wyoming. II. The Torrington Member of the Lance Formation and a Study of a New Triceratops. By Erich M. Schlaikjer. 40 pp., 6 pls. January, 1935.

No. 3. Contributions to the Stratigraphy and Palaeontology of the Goshen Hole Area, Wyoming. III. A New Basal Oligocene formation. By Erich M. Schlaikjer. 21 pp. 8 pls. January 1935.

No. 4. Contributions to the Stratigraphy and Palaeontology of the Goshen Hole Area, Wyoming. IV. New Vertebrates and the Stratigraphy of the Oligocene and Early Miocene. By Erich M. Schlaikjer. 94 pp., 41 pls. May, 1935.

No. 5. Some Ordovician Cystids from Russia. By Fred B. Phleger, Jr. 10 pp., 1 pl. July, 1935

No. 6. Leanchoilia and Other Mid-Cambrian Arthropoda. By Percy E. Raymond. 29 pp. July, 1935.

Vol. LXXVII

No. 1. Studies of the Cranial Anatomy of *Ascaphus truei* Stejneger, the American "Leiopelmid". By C. G. S. de Villiers. 38 pp. March, 1934.

No. 2. Studies of Myctophinae in the Museum of Comparative Zoölogy. I. Revision of Type Specimens. II. Myctophinae collected by C. O'D. Iselin in the North Atlantic in 1928. By A. E. Parr. 28 pp. May, 1934.

No. 3. A Second Revision of the Ants of the Genus Leptomyrmex Mayr. By William Morton Wheeler. 52 pp. June, 1934.

No. 4. The Anoles. II. The Mainland Species from Mexico Southward. By Thomas Barbour. 37 pp. June, 1934.

No. 5. Neotropical Ants Collected by Dr. Elisabeth Skwarra and Others. By William Morton Wheeler. 83 pp. November, 1934.

No. 6. Australian Reptiles in the Museum of Comparative Zoölogy, Cambridge, Massachusetts. By Arthur Loveridge. 144 pp. 1 pl. December, 1934.

No. 7. Critical Notes on Middle American Birds. By A. J. van Rossem. 107 pp. December, 1934.

No. 8. Notes on the North American Harvesting Ants of the Genus Pogonomyrmex Mayr. By O. Wilfred Olsen. 24 pp., 15 pls. December, 1934.

Vol. LXXVIII

No. 1. Australian Amphibia in the Museum of Comparative Zoölogy Cambridge, Massachusetts. By Arthur Loveridge. 60 pp., 1 pl. January 1935.

No. 2. The Butterflies of Cuba. By Marston Bates. 197 pp. February, 1935.

No. 3. The Ornithology of the Republic of Panama. By Ludlow Griscom. 123 pp. April, 1935.

Vol. LXXIX

No. 1. Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. I. New Reptiles and Amphibians from East Africa. By Arthur Loveridge. 19 pp. February, 1935.

No. 2. Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. II. Crustacea. By Mary J. Rathbun. 7 pp., 2 pls. July, 1935.

Memoirs: —

Vol. LIV

No. 2. Some Additional Fossil Echini from Jamaica. By Benjamin Walworth Arnold and Hubert Lyman Clark, 19 pp., 5 pls. December, 1934.

Publications by the Museum Staff

ALLEN, G. M.

The Former Occurrence of the Dugong in Chinese Waters. China Journ., **22**, pp. 79–82, pl. 1. February, 1935.

Observations on the Behavior of Animals During the Total Solar Eclipse of August 31, 1932. Mammals. Proc. Amer. Acad. Arts Sci., **70**, no. 2, pp. 62–69. March, 1935. (With H. J. Coolidge, Jr.)

Natural History Collecting. Mammals. Birds. Handbook of Travel. Harvard Travellers Club, ed. 2, pp. 304–310. April, 1935.

In Memoriam: Charles Wendell Townsend. Auk, **52**, no, 3, pp. 227–232, pl. 8. July, 1935.

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A few New North American Neuroptera. Psyche, **42**, no. 1, pp. 53–57. March, 1935.

Supplementary Neuropteroid Insects from Mt. Kinabalu, Borneo. XXVIII. Journ. Fed. Malay States Mus., **17**, pt. 3, pp. 567–578, 23 figs. August, 1934.

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A Record Crocodile, *Crocodilus porosus*. Singapore Naturalist, no. 3, p. 88. May, 1934.

Observations on Antillean Tortoises and Terrapins. Copeia, no. 3, pp. 111–113. October, 1934.

A New Race of Rock Iguana. Occ. Papers Boston Soc. Nat. Hist., **8**, pp. 197–198. November, 1934. (With Benjamin Shreve).

The St. Helena Frog. Copeia, no. 4, p. 183. December, 1934.

A New Pseudemys from Cat Island, Bahamas. Occ. Papers Boston Soc. Nat. Hist., **8**, pp. 205–206. February, 1935.

Concerning some Bahamian Reptiles, with Notes on the Fauna. Proc. Boston Soc. Nat. Hist., **40**, no. 5, pp. 347–366. February, 1935. (With Benjamin Shreve).

Rats, Lice and History. A Review. The Atlantic Monthly, **155**, no. 3, pp. 6 & 8. March, 1935.

Snake Bite and Its Treatment. Handbook of Travel. Harvard Travellers Club, ed 2, pp. 422–427. April, 1935.

Second List of Antillean Reptiles and Amphibians. Zoölogica, **19**, no. 3, pp. 77–142. June, 1935.

Cuban Red-Tailed Hawk. Occ. Papers Boston Soc. Nat. Hist., **8**, pp. 207–208. July, 1935.

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The Peristigmal Cells of Trypetid Larvae. Ann. Ent. Soc. Amer., **27**, no. 1, pp. 1–4, 6 figs. March, 1934

The Butterflies of Cuba. Bull. Mus. Comp. Zoöl., **78**, no. 2, pp. 63–258, 24 figs. February, 1935.

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The Hippoboscidae of the Galapagos Archipelago. With an appendix on the Tabanidae. Proc. Calif. Acad. Sci., (4), **21**, no. 11, pp. 131–138. December, 1933.

Notes on American Nemestrinidae. Second paper. Journ. N. Y. Ent. Soc., **42**, no. 2, pp. 163–184. June, 1934.

Les Races de Coloration de *Vespa luctuosa* de Saussure et de *Polistes tenebricosus* Lepeletier. Bull. Mus. Roy. Hist. Nat. Belgique, **10**, no. 28, pp. 1–11. September, 1934.

The Molluscan Intermediate Host of the Blood Fluke, *Schistosoma japonicus* Katsurada in the Phillippines. Journ. Parasitol. **20**, no. 5, pp. 280–282. September, 1934.

Notes on the Black-Flies or Simuliidae, with special reference to those in the Onchocerca Region of Guatemala. In R. P. Strong, et al., *Onchocerciasis,* Harvard Univ. Press, pp. 175–224. November, 1934.

Studies of African Land and Fresh-Water Mollusks. V. Three New Achatinidae in the Collections of the Berlin Zoölogical Museum. Rev. Zoöl. Bot. Afric., **26**, no. 1, pp. 112–119, 2 pls. December, 1934. (With W. J. Clench)

Notes on the Genus Moegistorhynchus and Description of a New African Species of Nycterimyia. Ann. Transvaal Mus., **15**, no. 4, pp. 491–502. April, 1935.

Additions and Corrections to the Revision of North American Vespinae (Entomologica Americana, 1932). Bull. Brooklyn Ent. Soc., **30**, no. 3, pp. 119–124. June, 1935.

An Unusual Case of Commensalism between a Snail (*Strophochilus oblongus* Müller) and a Coprid Beetle. Nautilus, **49**, no. 1, pp. 35–36. July, 1935.

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